

A. FRMC - The New York State Computer Chip Hybrid Integration Partnership Capital (W664)

July 23, 2009

General Project Plan

- Grantee:** Fuller Road Management Corporation (“FRMC”)
- Beneficiary Entity:** The Albany Nanotech Complex of the College of Nanoscale Science and Engineering of the University at Albany, State University of New York (“CNSE”).
- ESD Investment:** A grant of up to \$50,000,000 to be used for a portion of the cost of clean room and infrastructure upgrades, fit-out, tool and equipment acquisition, and installation for the CNSE-IBM Computer Chip R&D Packaging Center (the “Center”).
- Project Location:** CNSE, Albany, Albany County
- NYS Empire Zone (or equivalent):** N/A
- Project Completion:** December 31, 2013
- Grantee Contact:** John Loonan, CNSE Vice President of Finance and Fiscal Management
CESTM Building, 251 Fuller Road
Albany, NY 12203
Phone: (518) 956-7359 Fax: (518) 437-8603
- Beneficiary Contact:** Same as above
- Project Team:**
- | | |
|-----------------------|----------------|
| Project Management | Edwin Lee |
| Legal | Jonathan Beyer |
| Affirmative Action | Laverne Poole |
| Design & Construction | Joseph Burkard |
| Environmental | Soo Kang |

Project Description:

Background

Grantee

Fuller Road Management Corporation is a private 501(c)(25) not-for-profit, real estate holding corporation established by The Research Foundation of SUNY and the UAlbany Foundation, Inc. in 1993. FRMC supports CNSE in conducting its research and development (“R&D”) and educational activities, particularly in the management and coordination of its portfolio of R&D

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centers and institutes. FRMC was formed to plan, design, develop, construct, own, and lease facilities necessary to create the environment wherein CNSE can develop and deploy basic and applied nanotechnology innovations and translate them into commercially viable applications. FRMC acts as the “landlord” and supports the brick and mortar and infrastructure needs and functions of CNSE. FRMC conducts its business by holding title to property, collecting income from the property and turning over the entire amount, less expenses, to its member organizations.

Beneficiary

Established in May 2005, CNSE is a global resource for research, development, education, and economic outreach in the nanotechnology and nanotechnology-enabled disciplines and applications of the 21st century, including nanoelectronics, bioinformatics, renewable energy, infotonics, environmental technologies, telecommunications, and biotechnology. CNSE serves as a critical enabler in establishing New York as a competitive and attractive location for the high-tech industries of the 21st century, leading to the creation of high-paying jobs for New Yorkers.

CNSE has developed a multi-phase, long-term strategic plan that reshapes the traditional departmental structure into four divisions of scholarly excellence in research and development, education, technology deployment, and economic outreach. Conceived as catalysts that encourage and stimulate cross-disciplinary educational and research initiatives, these divisions represent the fundamental intellectual underpinnings of nanotechnology and can be summarized as follows:

Nanoscience: The observation, identification, description, discovery, experimental investigation, and theoretical interpretation of nanoscale phenomenon;

Nanoengineering: The application of nanoscience principles to practical applications, such as the atomic scale design, manufacture and operation of efficient and functional structures, machines, processes, and systems;

Nanoeconomics: The formulation, study and analysis of the economic and business principles underlying the development and deployment of nanoscale know-how, products and systems; and

Nanobioscience: The application of nanoscale scientific concepts and principles to the study of biological, biomedical and medical procedures, practices, structures, systems, and organisms.

CNSE has created partnerships and provides the management and coordination of a comprehensive portfolio of vertically integrated R&D centers that provide a smooth and inclusive transition of scientific concepts from theoretical conception into actual product demonstration and introduction to market.

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CNSE core partnerships include:

- **IBM's Center for Semiconductor Research ("CSR")**, established in 2005, is a long-term, multi-phase, joint R&D cooperative program on future computer chip technology nodes beginning with the 32nm computer chip device node. Industry partners within the CSR include IBM, Advanced Microdevices, SONY, Toshiba, Tokyo Electron ("TEL"), and Applied Materials. The CSR provides full vertical integration of the design, modeling, fabrication, testing, and pilot-prototyping capabilities required to produce the nanochips of the future, beginning with a blanket silicon wafer and ending with workable nanochip demonstration vehicles;
- **TEL's Technology Center America ("TTCA")** in Albany provides expertise in computer chip equipment manufacturing and wiring technologies. TTCA represents TEL's only R&D facility located outside of Japan, and involves the installation of a spectrum of alpha- and beta-type TEL tools, placement of TEL researchers and engineers from Japan, Europe and the U.S., and joint R&D activities on a variety of advanced computer chip programs with emphasis on future generations of computer chip wiring technologies;
- **International SEMATECH** is a semiconductor technology development consortium. It conducts and sponsors high-tech research, collaborating with equipment and materials suppliers, as well as government and academic research centers, to refine the manufacturing tools and technology necessary to produce future generations of computer chips. International SEMATECH's member companies include IBM, Intel, Hewlett-Packard, Texas Instruments, GlobalFoundries, Micron, National Semiconductor, Infineon Technologies (Germany), Panasonic (Japan), Renesas (Japan), Samsung (Korea), TSMC (Taiwan), UMC (Taiwan), Toshiba (Japan), and NEC (Japan);
- **The Applied Materials ("AMAT") R&D Center** in Albany also provides expertise in computer chip device technologies. The AMAT R&D Center is the only applied materials facility outside of its headquarters in San Jose. The AMAT R&D Center is pursuing four principal tasks that are similar in scope and complementary in technology applications with those of the TEL TTCA;
- **The ASML R&D Center** in Albany supplies the overall Center with lithography technologies. Like TEL and Applied Materials, the Albany location is ASML's only facility located outside its main headquarters. The ASML R&D Center is pursuing tasks similar in scope and complementary in technology applications with those of the TEL TTCA and AMAT R&D Center; and
- **Vistec Semiconductor Systems**, maker of electronic beam lithography systems, wafer process control and mask metrology systems moved its headquarters from Cambridge, England to the Watervliet Arsenal and the CNSE complex. At CNSE, Vistec conducts E-Beam research and development, as well as wafer process control and mask metrology.

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In July 2008, Governor Paterson, Assembly Speaker Silver and Senate Majority Leader Skelos announced significant new investments by IBM and New York State, accelerating New York's international leadership in nanotechnology research and development, and creating up to 1,000 new high-tech jobs upstate. The state will provide a total of \$140 million in economic development grants, leveraging more than \$1.5 billion from IBM. The investment will go toward three separate and complementary components of a comprehensive project, supporting the nanotechnology computer chip activities of IBM, including: (1) the expansion of the IBM-CNSE partnership under the CSR at the CNSE Albany NanoTech Complex, which is expected to result in the creation of 325 new R&D jobs. This component will be supported by a \$25,000,000 grant to be administered by ESD under project number W662; (2) the creation of a new, advanced 120,000-square-foot semiconductor packaging research and development center to package computer chips into boards and systems that could be used in laptops, servers, cell phones, and other devices. The Center will be established, managed and owned by CNSE, with IBM serving as a key partner. This component will be supported by a \$50,000,000 grant to be administered by ESD and is the subject of this grant (W664); and (3) the upgrade of IBM's East Fishkill facility in Dutchess County for computer chip prototyping and manufacturing. New York State has committed \$65,000,000 to support this effort.

ESD has awarded the following grants in support of CNSE's nanotechnology initiative:

- **October 2002:** A \$50 million grant (Q314) to FRMC for the design and construction of the Albany Center of Excellence in Nanoelectronics ("NanoFab II"). ESD awarded an additional \$10 million grant to introduce semiconductor industry lithography leader ASML as a new industry funding and development partner to the New York State Center of Excellence in Nanoelectronics and Nanotechnology ("CENN"), which is situated within the CNSE. The project is complete and the funds have been fully disbursed;
- **February 2003:** A \$60 million grant (R084) to the Research Foundation of SUNY for the consortium International SEMATECH North to establish a R&D program at the CENN. With subsequent amendments, the state has granted \$160 million toward a total \$471.5 million SEMATECH program. The project is complete and the funds have been fully disbursed;
- **February 2004:** An initial \$33.88 million grant (R852) to the Research Foundation to establish TEL's \$300 million R&D program at the CENN. Subsequent grants were made to bring ESD's total investment to \$91 million;
- **May 2005:** A \$20 million grant (T408) to NanoTech Resources, Inc. d/b/a Albany NanoTech for the establishment of the \$338 million CSR with IBM. ESD funds were used for the acquisition and installation of semiconductor processing equipment to be used in nanoelectronics research. The project is complete and the funds have been fully disbursed;

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- **December 2006:** Grants totaling \$76 million (U447-\$75 million; V042-\$1 million) to FRMC for the expansion of the state-of-the-art 300mm wafer Class 1 capable clean room at CNSE and the purchase of new clean room processing and support equipment. The grants also include the implementation of research and development programs for the Institute of Nanoelectronics Discovery and Exploration (“INDEX”), according to a five-year operational plan, at a minimum of \$1 million per year. For U447, \$64,465,179 has been disbursed;
- **February 2007:** A \$1.415 million working capital grant (V174) to the Research Foundation for fostering collaboration between the academic research community and the business sector to develop and commercialize new products and technologies; promote critical private sector investment in emerging high-technology fields in New York State; and create and expand technology related businesses and employment. No funds have been disbursed to date; and
- **January 2008:** A \$300 million grant (V895) to the Research Foundation for the relocation and establishment of the International SEMATECH headquarters and its advanced research and development operations at the CNSE. To date, \$120M of the grant has been disbursed.

The Project

IBM and CNSE have formed a partnership to undertake the R&D, prototyping and manufacturing necessary to develop and deploy the 28 nanometer (“nm”) transistor integrated circuitry computer chip. The development of the 28nm chip is intended for emerging applications in ultra-fast telecommunications, smart computing, electronic tether-free gaming, automotive and consumer electronics, defense, and energy. Healthcare applications include nanomedicine, biomolecular science, nanovaccinology, medical nanorobotics, nanomedical biocompatibility, molecular medicine, and nanosensor-based biochips for real-time diagnosis and treatment of chronic and genetic biological diseases. The successful achievement of this innovation and commercialization initiative requires “off-chip” or “packaging” R&D, which includes the R&D required to invent new approaches to package the chips into boards and systems.

The \$50M grant administered by ESD will support the expansion of the IBM-CNSE partnership by establishing the Center at the CNSE Albany NanoTech Complex. Project activities include: the upgrade of 10,000 square feet of laboratory space to Class 100 capable clean room space in the already constructed NanoFab South building; acquisition and installation of air handling equipment, chiller and abatement system, advanced chip package processing equipment, tooling, tooling infrastructure, advanced 300mm wafer three-dimensional chip integration equipment, wafer-to-wafer bonders, wafer grinders, chip-to-chip bonder, testing and measurement tools and systems, and wafer handling and monitoring equipment and servers. IBM will work with CNSE as equal partners to develop and deploy the 28nm transistor computer chip and assist CNSE in

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the recruitment of new high-tech jobs to support the CSR. Design and planning of the clean room has commenced and CNSE expects to complete the fit-out of the clean room in the 4th quarter of 2010.

The project is expected to create the innovative environment for leading-edge off-chip (packaging) technologies and create new manufacturing standards for the industry and opportunities for the attraction and retention of global nanoelectronics manufacturers, suppliers and contractors across the state of New York by assembling new industry-university-government consortia and public-private partnerships to convert breakthroughs in computer chip technology into real business opportunities and revenue-generating ventures. Additionally, the project is expected to create 200 high-tech jobs at the CNSE Albany NanoTech Complex and 475 high-tech contractor and supplier jobs that support the Center at the SUNY Institute of Technology and locations between Albany and Rome, New York.

Financing Uses	Amount	Financing Sources	Amount	Percent
Tool and systems acquisition & upgrade	\$50,000,000	ESD Grant	\$50,000,000	28%
Tool installation	10,000,000	IBM	130,000,000	72%
Clean room fit-up & infrastructure upgrade	20,000,000			
Operating costs	100,000,000			
Total Project Costs	\$180,000,000	Total Project Financing	\$180,000,000	100%

Financial Terms and Conditions:

1. The Grantee will reimburse ESD for all out-of-pocket expenses incurred in connection with the project.
2. The Grantee will be obligated to advise ESD of a material adverse change in its financial condition prior to disbursement.
3. Up to \$50,000,000 will be disbursed to the Grantee during the course of the project, no more frequently than monthly, in compliance with the Design & Construction Requirements, assuming that all project approvals have been completed and funds are available. Payment will be made upon presentation to ESDC of an invoice and such other documentation as ESDC may reasonably require. Expenses must be incurred on or after April 1, 2009 to be considered eligible project costs.
4. The Grantee shall provide an annual report, including financial reports and project impact and performance measurements, in a manner prescribed by Empire State Development.

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5. ESD may reallocate the project funds to another form of assistance, at an amount no greater than \$50,000,000, for this project if ESD determines that the reallocation of the assistance would better serve the needs of the Grantee and the State of New York. In no event shall the total amount of any assistance to be so reallocated exceed the total amount of assistance approved by the Directors.

Design and Construction:

The scope of this project calls for upgrades to the 10,000-square-foot clean room laboratory in the existing NanoFab south building at CNSE Albany NanoTech Complex on the SUNY Albany campus. The project is currently in planning and design phases and D&C will review applicable drawings and specifications.

D&C will, at its option, attend meetings and monitor fit out progress. D&C will review and approve all change orders, contractor requisitions and verify that all requirements have been satisfied prior to the approval and release of ESD funds.

The aforementioned project will be reviewed in conjunction with D&C requirements and forms.

D&C will review the completion of fit-out documents, project bidding and, at its discretion, visit the site before funds are distributed.

Environmental Review:

Pursuant to the State Environmental Quality Review Act (“SEQRA”), Article 8 of the Environmental Conservation Law, and its implementing regulations (6 NYCRR Part 617), and in connection with the approval of funding for the Albany Center of Excellence in Nanoelectronics, the Directors made a Determination of No Significant Effect on the Environment at its meeting of October 17, 2002 for the CESTM Phase II expansion (also known as “NanoFab South”) at CNSE where the proposed project will be located.

A Technical Memorandum (the “Tech Memo”) to assess the proposed project was prepared by ESDC staff. The Tech Memo concluded that the proposed action would not result in impacts different from or greater than what was assessed in the previous environmental review. Therefore, no further environmental review is required in connection with this action.

Affirmative Action:

ESDC’s Non-Discrimination and Affirmative Action policies will apply. FRMC, its affiliates and/or beneficiary entities, as applicable, and its contractors and suppliers shall use good faith efforts to achieve not less than 10% Minority/ Women-owned Business Enterprise contractor and/or subcontractor participation in the design, programming and pre-construction and construction activities, and provide for meaningful Minority and Female workforce participation during upgrades.

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Statutory Basis – Capital Projects Fund - Nanotechnology:

The project is authorized in the 2009 – 2010 New York State budget. No residential relocation is required as there are no families or individuals residing on the site.